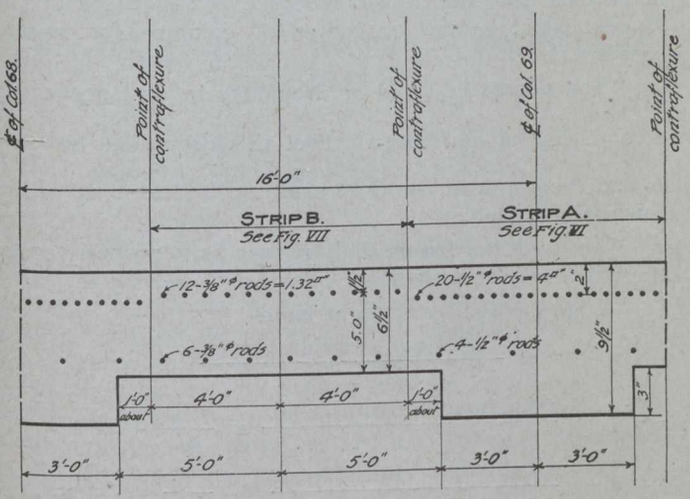
Reading No. 21 gives

stress in concrete = 248 lbs. compression in bottom.

On referring to readings Nos. 137 and 11 it will be noticed that the stress in No. 11 is zero, so we cannot consider a section through 137, and the readings for Nos. 153 and 21 are on the wall side, which we are not now considering. This, therefore, leaves the readings Nos. 140 and 12 as the ones to be considered.

Assume a section to be taken along 1-1 cutting through the centre of 140 and 12 and running parallel to column 68 and 69.



SECTION 1.1.

Referring to Diagram A it will be noticed that the negative bending moment in strip A, $M_r = -\frac{WL}{30}$

$W_L = 142 \times 16 \times 16 = 36{,}352$ lbs; therefore

$M_r = -\frac{36{,}352 \times 16 \times 12}{30}$ in.-lbs. = 232,652 in.-lbs.

Referring to section 1-1 it will be noticed that there are twenty ½-in. ϕ rods and that they are 2 ins. below the concrete. From this section Fig. 1 has been made.

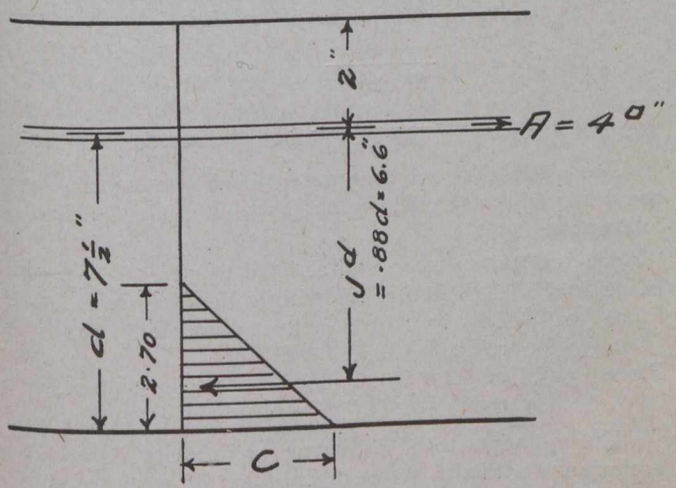


Fig. 1.

A = 4 sq. ins. = ½% of steel. The unit stress in the steel at No. 140, due to the live load, according to the Chicago Code, is

$s = \frac{232{,}652}{4 \times 6.6} = 8{,}812$ lbs. per square inch,

which is about 5.9 times as great as that given by the extensometer reading No. 140, which was 1,500 lbs.

If the compressive stress in the concrete is now considered, then

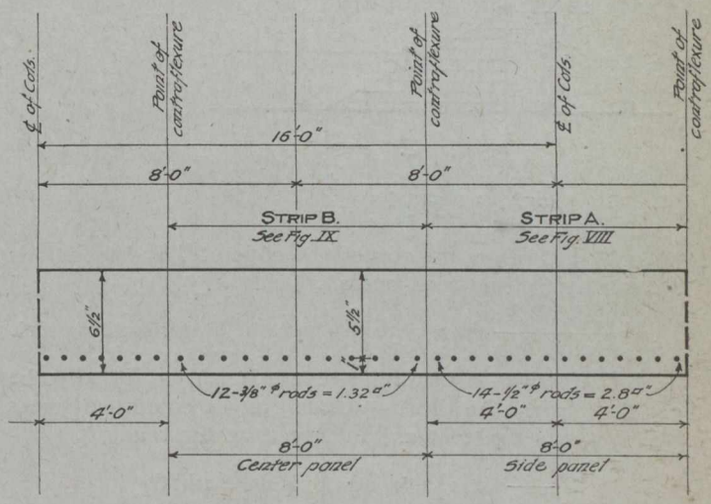
$$\frac{c}{2} \times 2.7 \times 6.6 \times 96 = 232{,}652$$

therefore $c = \frac{232{,}652 \times 2}{2.7 \times 6.6 \times 96} = 272$ lbs. per sq. in.

which is about three times as great as that given by reading No. 12, which was 90 lbs.

Referring to Diagram A, the bending moment at the centre of strip A is

$M_b = \frac{W_L L}{60} = \frac{36{,}352 \times 16 \times 12}{60} = 116{,}326$ in.-lbs.



SECTION 2.2.

Referring to section 2-2, it will be seen that there are fourteen ½-in. ϕ rods and that they are 1 in. from the bottom of the concrete. From this section Fig. 2 has been made.

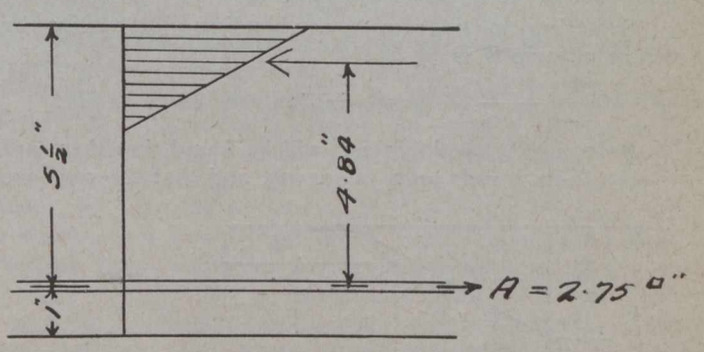


Fig. 2.

Reading No. 17 gives steel stress = 75 lbs. per square inch tension.

Reading No. 7 gives steel stress = 1,425 lbs. per square inch tension.

Since Mb = 116,326 in.-lbs. as found above,

$\therefore s = \frac{116{,}326}{2.75 \times 4.84} = 8{,}739$ lbs. per square inch, which is more than six times as great as reading No. 7, the greater of the two readings.

As there were no corresponding readings taken on the concrete it is impossible to compare them to the Chicago Code.